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SOME OBSERVATIONS ON THE FOOD HABITS OF THE BLUE JAY (*Cyancitta cristata*).

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IT is not the object of this paper to give a detailed account of the food habits of the blue jay based on the examination of the stomachs. However, more than 150 stomachs have been examined, and a few notes will be given on this phase of the subject.

In 1896 Mr. F. E. L. Beal, assistant biologist, United States Department of Agriculture, made a detailed report on the examination of 292 stomachs which he had carefully studied. The material had been collected in every month of the year and from twenty-two states. At the close of his report, where he sums up the interesting results of his investigations, he says: "The most striking point in the study of the food of the blue jay is the discrepancy between the testimony of field observers concerning the bird's nest-robbing proclivities and the results of stomach examinations. The accusations of eating eggs and young birds are certainly not sustained, and it is futile to attempt to reconcile the conflicting statements on this point, which must be left until more accurate observations have been made. In destroying insects the jay undoubtedly does much good. Most of the predaceous beetles which it eats do not feed on other insects to any great extent. On the other hand, it destroys some grasshoppers and caterpillars, and many noxious beetles, such as scarabæids, click beetles (elaterids), weevils (curculionids), buprestids, chrysomelids, and tenebrionids. The blue jay gathers its fruit from nature's orchard and vineyard, not from man's; corn is the only vegetable food for which the farmer suffers any loss, and here the damage is small. In fact, the examination of nearly 300 stomachs shows that the blue jay certainly does far more good than harm."

I have examined more than half as many stomachs of the blue jay as were examined by Mr. Beal. More than half of my material was collected in the city of Lawrence, and none of it more than ten miles distant. So far as stomach examinations go the results of my investigations were not very different from those of Mr. Beal. The blue jay takes a very great variety of food of both animal and vegetable kinds. The kind of food eaten depends largely upon the kind the locality furnishes during any particular season of the year. The food of July and August, as a rule, is very different from that of January and December. During the summer months the animal food, mostly insects, sometimes reached as high as sixty to seventy-five per cent. of the total food mass. This same per cent. was sometimes reached in case of fruit, especially when blackberries and mulberries were being eaten. In winter time, especially when the ground was frozen and covered with snow, vegetable matter, chiefly corn, constituted the great bulk of the jay's food. Again, the food of the jay birds in and around the city of Lawrence varies considerably from that of the jays that feed in the country districts.

The food of twenty-seven jays killed the third week in September, 1907, some nine miles southwest of Lawrence, in a wild, wooded district, was quite different from that of an equal number of birds taken during the month of September in and around the city of Lawrence. Over sixty per cent. of the mass of the food of the birds taken in the country district was made up of acorns. Only two stomachs contained even a trace of corn. The stomachs of the birds taken in the city showed over fifty per cent. of the food mass to be grain, mostly corn. The birds taken in the country district had eaten thirty per cent. insect food, and about twenty per cent. of this was made up of black ground-beetles, such predacious beetles as carabids being very common. There were also a considerable number of smooth-bodied caterpillars, the larvæ of the common hummingbird, sphinx or hawk moths not being uncommon, some of which measured as much as two and one-half inches in length. Grasshoppers, snails, snout and long-horn beetle, ants, spiders—in fact, almost any insect, even hairy worms, were occasionally found. The insect food of the birds taken in the city was not over fifteen per cent. of the food mass, dark-colored ground-beetles and grasshoppers predominating.

During the winter season the city blue jay takes almost any kind of food that comes handy, feeding in the public roads, the alleys, in back dooryards and in barn-yards. At this season of the year grain, mostly corn chop, makes up the bulk of the food mass. However, such material as cooked meats, potatoes, bread, oatmeal, rice, boiled eggs, apples and bananas are not infrequently found in their stomachs. A considerable amount of mineral matter is always found in the gizzards, such as pieces of stone, glass, various kinds of gravel, and occasionally such articles as beads, buttons and pieces of broken china.

I now desire to speak of some observations on the food habits of the blue jay, made by myself and others, not based on the examination of the contents of stomachs. One day last winter I noticed nearly a pint of walnut hulls at the mouth of a spout that carried the water from the roof of the wash-house. At first I thought it was the work of squirrels. I soon learned that blue jays were taking pieces of walnuts that were left near some stones where the boys had been cracking them. The jays would carry the pieces of walnuts to a tree that overhung the wash-house. The birds would hold the pieces of walnuts on a limb with their feet and pick out the meats. We would crack nuts for them in the evening and watch them perform early next morning. They would take whole acorns, hold them the same as they did the pieces of walnuts, and pick them to pieces. They also tried whole walnuts and hickory-nuts, but failed to get them open. Walnuts are undoubtedly an unnatural food for blue jays. Yet after they got a taste of them they eagerly searched for the broken pieces every morning. When food is plenty the jays eat what they like best; when it is scarce they eat almost anything in the shape of food that they can find. They are fond of mulberries; I have seen them eat them many times in my own yard. I have also seen them eat blackberries, apples and green corn.

On July 21, 1907, I saw three working in a sweet-corn patch. One of these birds picked open an ear that had not been injured by other birds and began vigorously to pick at the grains of corn.

The above observations are such as might be made by any one willing to give a little time to the study of the blue jay in his natural haunts.

There are other observations not so easily made, and more to the point of this paper, which I now desire to give. My two small boys, George and Lindsay, ages eight and twelve respectively, aided me very materially in making these observations. They were usually in the yard a great deal of the time and had many opportunities as well as a keen interest in any disturbances that might take place in bird society. Two pairs of blue jays built their nests in my yard during the past summer. The birds were very shy and very quiet about their nesting quarters, and unless one understood something of their nesting habits he would never even suspect that there was a nest anywhere in the neighborhood. My present home place has five and one-half acres in it and is partly covered with forest and fruit trees. The boys kept the English sparrows exterminated by the use of a small gun. The result was that at one time we counted as many as twenty wild native bird's nests that were being used on our own grounds.

One morning in May I saw a jay picking at something on a fence-post, and threw a stone so as to frighten the bird suddenly. When I reached the spot I found half of the shell and about one-third of the contents of a turtle-dove's egg. A few mornings later I saw a jay picking at something on a dead limb of a fallen apple tree. I frightened the bird by throwing a hammer at it, which I happened to have in my hand. On the limb I found part of the remains of a robin's egg. The very next morning, near the same spot, I saw a jay flying with something in its mouth. It lit high up in an elm tree, just over the roadway. After the jay began to pick at the object I approached and found small pieces of a speckled egg-shell which I could not determine for a certainty; by comparison it was that of a brown thrasher or cardinal redbird. In May, 1906, just a year before the above observations were made, a robin built her nest in a small tree that grew not more than ten feet from our house. The tree was beside the pump and near the kitchen door. We naturally took unusual interest in the bird, as the nest was so low that by standing on a chair placed on the sidewalk it could be touched by the hand. My boys saw nearly every movement the birds made while the nest was being constructed. Only a few days had passed when they informed me that five little blue eggs were in the nest. Immediately the old robin began her duties of incubation, and everything looked favorable for a fine brood of semidomesticated robins right in front of our door. Quite early one morning I heard, through an open window, a great commotion among the birds out of doors. I ran to a window and saw robins and catbirds flying at a blue jay. I hurried down-stairs and was out of doors just in time to see the jay fly to a tree some distance away, the robins and catbirds still pursuing. On the sidewalk, under the little tree where the robins had their nest, was part of the shell of a robin's egg and a mangled embryo bird that had been torn out of it. I examined the robin's nest and found nothing in it except part of a broken egg-shell.

The catbirds above mentioned had their nest in a small catalpa tree about thirty yards from the house. There were four young birds in the nest. They were not disturbed at this time. A few days later, just at noon time, the boys came running to the house shouting that the jays were fighting the catbirds. We hastened to the scene of disturbance just in time to see a jay fly from a spot several yards beyond the catalpa tree. When we reached the place we found one of the young catbirds, nearly full grown, with its head and back so badly picked that it soon died. An examination of the nest showed only two birds remaining, which went to show that this was not the first attack that had been made on the young in the nest. A few days later, while I was at the University, the small boys saw a jay on a limb of the catalpa tree picking one of the young catbirds. Lindsay took a gun and killed the jay, a thing he had begged me to let him do on the occasion of the first robbery and murder we had witnessed in the catbird family. On my return home I examined the catbird's nest. It had but one bird left in it and that one was so badly picked that it was dead the next morning.

June 18, 1905, Lindsay and George saw a jay bird fighting a young catbird that was large enough to fly from one bush to another. Lindsay ran after his gun and returned as soon as possible, to find, however, that the jay had the catbird killed. He shot the jay. I dissected the bird and found feathers and mulberries in its stomach.

May 19, 1907, the boys, who were playing in the yard, called to me that a jay was fighting the robins in an old apple tree near the wood-house. I hastened to the spot. The jay did not leave the tree until I threw a stone at it. I found a half-grown robin on the ground under the tree with a gash an inch long in its side and neck. George, my youngest boy, climbed the tree and put the wounded robin in the nest with its three brothers and sisters.

May 21, George brought me a young dead robin with its head picked and a hole in its side, that he found under the old apple tree. I went to the tree to examine the nest and found that it had been robbed of all its young birds.

July 5, 1907, Lindsay saw a turtle-dove trying to fight a jay from its nest in an elm tree near our house. The jay got one of the dove's eggs and flew to a near-by fence. Most of the contents of the egg spilled out before the jay reached the fence. The boy begged me to let him take the gun and kill the jay. I told him if we killed the jay that we would not get any more observations. He said he had all the observations he wanted on jays robbing nests and killing young birds and that what he wanted when he saw a jay was a gun.

BLUE JAYS KILL YOUNG CHICKENS.

June 18, 1905, about eight A. M., as I walked back of the barn, I saw a blue jay picking at something on a low shed roof. It was a young chicken, less than a week old. The jay flew into a near-by tree, leaving the chicken dead, with one eye picked out and the skin torn from its neck and breast. A few days before I had placed a hen and chickens under an old peach tree in a box coop fixed up with a rat-proof wire door; so I was somewhat puzzled when four or five of the chickens had disappeared. I thought of cats and rats, but the day before I caught the real thief I found the mangled body of a young chicken on the end of an old peach-tree stump. This really put me to watching the jays, as I had noticed them a number of times flying about when I went to feed the chickens. It was not an uncommon thing for the jays, in winter season, to light on the troughs where the chickens were fed and help themselves. I watched for the jays every morning but did not see them with another chicken, though all the young chickens disappeared except three. I might say that I did not try to protect the young chickens after I found that the jays were taking them. When I let the little birds out in the morning I would watch a while with the hope of seeing a jay take one, as I wanted to see how the attack was made.

On June 23, 1906, Dr. L. B. Powell, a neighbor of mine, and an intelligent gentleman, reported to me that he had lost about a dozen young chickens, less than a week old, that had been killed by a pair of blue jays that had a nest in a tree in his yard. After he saw the jays kill some of the young chickens and pick their brains out, he shot the old blue jays and took the young ones from their nest and pulled their heads off.

Mr. C. D. Bunker, my assistant in the museum at the University, reported to me that the blue jays killed a number of young chickens for him two years ago. The bodies of the young chickens were more or less torn to pieces and partly eaten up. He also reported two canary birds killed by blue jays. The bird-cages were left on the porch. The jays caught the little birds and pulled them out through the spaces between the wires of the cage. Miss Alice Lichfield, a classmate of mine at the University, told me a number of years ago that the blue jays had killed a number of young chickens for her, but she failed to notice how the bodies had been mutilated.

Mr. Will Bullene, who lives a few blocks southeast of me, and who, from his general knowledge of birds, is abundantly able to make correct observations, told me of a neighbor of his that had lost quite a number of young chickens, due to blue jays. In this case there was a flock of about seventy-five young chickens. They were kept in a coop and allowed to run, after being fed, in quite a large runway enclosed by wire screening. A number of the little birds had been found dead in the runway, with their bodies mutilated. The owner was puzzled to make out what it was that was doing the mischief. Mr. Bullene suggested that some one be put to watch. It was not long before a jay was seen to pounce upon a chicken and pick it to death. After a few more chickens was killed, Mr. Bullene set steel traps on the fence posts where the jays were accustomed to light and caught a number of them. In this particular case the jays picked the crops of the chickens open and ate the feed, mostly corn chop.

A number of other cases have been reported to me concerning the jay's habit of robbing nests and killing young birds. I will give but one more illustration of the jay's wickedness in this line, and that came under my personal observation. It was in August, 1887. A pair of house wrens had built their nest in a little cubby-hole in the corner of our porch. One afternoon, about five o'clock, while Mrs. Dyche and myself were sitting on the porch, a little wren flew down from the nest. It was a young bird, and that was the first time it had ever tried its wings. While we were admiring the little midget hopping about on the porch, a blue jay darted from somewhere and with a great flutter and commotion of its wings grabbed the little wren and flew to a fence not more than fifteen feet away. I made a few hurried steps into the house and secured a small shotgun that happened to be handy. When I returned the jay flew a rod farther along on the fence. However, it was not more than two rods away, an easy shot, and I killed the bird. Mrs. Dyche, who was watching, had meantime noticed the little wren fall by the side of the fence from the spot where the jay first lit. I picked up the little dead wren and on examination found a small cut under one wing. There was no other cut or bruise on its body that I could find. I now picked up the blue jay. It had a little bloody heart in its beak. I dissected the wren and found that its little heart had been pulled out through the small cut that the jay had made under its wing. I dissected the jay and found two hearts in its stomach, quite a little larger in size than the one that had been pulled from the unfortunate little wren.

The very next evening I saw a jay dart after a little young wren, perhaps one of the same brood. My presence made it possible for the little wren to get under cover of some small bushes. The jay lit on the fence to watch. I secured my gun and shot at the jay, crippling it so that it flew to a neighbor's yard and died. I was reported to the city attorney, Mr. W. C. Spangler, for shooting poor innocent birds.

After recording such observations I cannot help but feel somewhat like my small boy, who, after he had seen the jay with his own eyes commit a number of robberies and murders, said that "he had all the observations he wanted on jays robbing nests and killing young birds, and that what he wanted when he saw a jay was a gun."